A T

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,366	03/06/2001	Roland A. Wood	H0001512 (256.087US1)	3295

128 7590 02/16/2005

HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN, NJ 07962-2245

EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. Box 1450
ALEXANDRIA, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/800,366
Filing Date: March 06, 2001
Appellant(s): WOOD, ROLAND A.

Rodney L. Lacy
For Appellant

EXAMINER'S ANSWER

MAILED

FEB 16 2005

GROUP 2800

This is in response to the appeal brief filed 6 December 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

First, appellant should note that former 37 CFR 1.192(c)(7) states: for <u>each ground of rejection</u> which appellant contests and <u>which applies to a group of two or more claims</u>, ... unless a statement is included that the claims of the group do not stand or fall together and, in the argument under paragraph (c)(8) of this section, appellant explains why the claims of the group are believed to be separately patentable. Thus it is clear that claims are grouped according the grounds of rejection. The appellant's statement in the brief that certain claims do not stand or fall together is not agreed with

because for each ground of rejection which appellant contests, appellant is grouping claims having different grounds of rejection. Further, merely pointing out differences in what the claims cover is not an argument as to why the claims are separately patentable.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,129,595	THIEDE et al	7-1992
5,258,619	DUVALL, III	11-1993
5,420,419	WOOD	5-1995
5,675,149	WOOD et al.	10-1997

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 7, 9-17, 20, and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood). It should be noted that frame time is the time in which a microbolometer produces a <u>complete</u> picture or image of an object being viewed (see lines 6 and 7 on pg. 2 of the specification).

In regard to claim **14**, Wood *et al.* disclose an infrared radiation detector apparatus, comprising:

(a) microbolometers in an array (column 5, line 65 to column 6, line 1);

(b) a timing circuit coupled to the array to apply two or more bias pulses (*i.e.*, each bias pulse results in a single measurement; US 5,420,419 column 6, lines 18-34

and Fig. 6) substantially sequentially to each microbolometer in the array during a frame (*i.e.*, exposure) time (*i.e.*, the time for producing a complete image from multiple measurements and averaging of sensor signals; column 5, lines 47-53);

(c) a measuring circuit coupled to the array to measure two or more resulting signals associated with each of the applied two or more bias pulses (*i.e.*, resulting in two or more measurements; column 5, lines 47-53) during the frame (*i.e.*, exposure) time;

(d) a computing circuit coupled to the measuring circuit to compute an average signal value (*i.e.*, averaging of sensor signals; column 5, lines 47-53) for each microbolometer in the array from the measured two or more resulting signals during the frame (*i.e.*, exposure) time; and

(e) an output circuit coupled to the computing circuit to produce an output signal based on the computed average value for each microbolometer in the array during the frame (*i.e.*, exposure) time is inherent in displaying an image corresponding to the output signals.

In regard to claim **1**, the method steps are implicit for the apparatus of Wood *et al.* since the structure is the same as the applicant's apparatus of claim 14.

In regard to claim **2** which is dependent on claim 1, Wood *et al.* also disclose (column 1, lines 55-58) recording and displaying IR images. Inherent in the formation of images is repeating the applying, measuring, computing, and producing steps to compute output signals during each frame time in order to form an IR image.

In regard to claim **7** (which is dependent on claim 1) and claim **20** (which is dependent on claim 14), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses are substantially equal in magnitude.

In regard to claim **9** (which is dependent on claim 1) and claim **22** (which is dependent on claim 14), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 2, lines 17-20) that the two or more bias pulses comprise two or more voltage bias pulses.

In regard to claim **10** (which is dependent on claim 1) and claim **23** (which is dependent on claim 22), Wood *et al.* also disclose (US 5,420,419 column 7, lines 26-28) that the two or more resulting signals comprise two or more current signals.

In regard to claim **11** (which is dependent on claim 1) and claim **24** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. Inherent in an average is at least two sensor signals each associated with an applied bias pulses and thus there are in the range of about 2 to 100 bias pulses dependent on the length of the exposure.

In regard to claim **12** (which is dependent on claim 1) and claim **25** (which is dependent on claim 24), Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the two or more bias pulses have time duration in the range of about 0.1 to 20 microseconds (*e.g.*, 5-6 μs).

In regard to claim **13** (which is dependent on claim 1) and claim **26** (which is dependent on claim 14), Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. The

exposure (*i.e.*, frame) time is inherently the time it takes for the array to produce a complete image of an object being viewed by the array.

In regard to claim **15** which is dependent on claim 14, Wood *et al.* also disclose (column 2, lines 57-59) that the output circuit further comprises an integrator (integrating preamplifiers 26) and an A/D converter (32) for converting the output signal to a digital signal value for each microbolometer in the array.

In regard to claim **16** which is dependent on claim 15, Wood *et al.* also disclose (column 4, lines 5-24) a digital image processor (36), coupled to the output circuit to receive the digital signal value associated with each microbolometer in the array and correct the received digital signal value for image defects.

In regard to claim **17** which is dependent on claim 16, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises a correction circuit, to apply a corrective electrical signal based on a correction value to the output signal to correct for resistance non-uniformity in each microbolometer to obtain a substantially uniform output signal value.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Applicant Admitted Prior Art.

In regard to claim **3** which is dependent on claim 2, the method of Wood *et al.* lacks applying a corrective electrical signal to the output signal to correct for resistance non-uniformity between the one or more microbolometers of the array to obtain a substantially uniform output signal value. Applicant admits (first paragraph on pg. 6) it is known in the art (such as US Patent 4,752,694) to apply a corrective electrical signal to

the output signal to correct for resistance non-uniformity between the one or more microbolometers of the array (*i.e.*, "coarse non-uniformity correction") to obtain a substantially uniform output signal value. Therefore it would have been obvious to one having ordinary skill in the art to apply a corrective electrical signal in the method of Wood *et al.*, in order to obtain a substantially uniform output signal value.

In regard to claim **4** which is dependent on claim 3, Wood *et al.* also disclose (column 2, lines 57-59) an integrator (integrating preamplifiers 26) and an A/D converter (32) to converting the substantially uniform output signal associated with each microbolometer to a digital signal value.

In regard to claim **5** which is dependent on claim 4, Wood *et al.* also disclose (column 4, lines 5-24) passing the digital signal values associated with each microbolometer in the array through a digital image processor to correct for image defects.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Applicant Admitted Prior Art as applied to claim 5 above, and further in view of Thiede et al. (US 5,129,595). In regard to claim **6** which is dependent on claim 5, the modified method of Wood *et al.* lacks that the image defects comprise fine offsets, gain non-uniformity, and dead pixels. Image defects such as fine offsets, gain non-uniformity, and dead pixels are well known in the art. For example, Thiede *et al.* teach (column 7, lines 45-66) the correction of gain non-uniformity and dead pixels in order to fully compensate for array non-uniformity. Therefore it would have been obvious to one

having ordinary skill in the art to correct for gain non-uniformity and dead pixels in the modified method of Wood *et al.*, in order to fully compensate for array non-uniformity.

Claims 8, 21, 27, 29, and 33-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619).

In regard to claim **8** (which is dependent on claim 1) and claim **21** (which is dependent on claim 20), the apparatus and method of Wood *et al.* lacks that the bias pulses are substantially equally spaced in time. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art to adjust the bias pulses waveform parameters (*e.g.*, pulses are substantially equally spaced in time) in the apparatus and method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating as taught by Duvall, III.

In regard to claim **27**, Wood *et al.* is applied as in claim 14 above. The apparatus of Wood *et al.* lacks that the resulting temperature in each of the microbolometers in the array is substantially uniform. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Minimizing detector heating due to bias results in minimal change in

detector temperature and thus the detector is at the substantially uniform initial temperature. Therefore it would have been obvious to one having ordinary skill in the art to adjust the bias pulses waveform parameters (*e.g.*, pulses are substantially equally spaced in time) in the infrared radiation detector apparatus and method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating resulting substantially uniform temperature as taught by Duvall, III.

In regard to claim **29** which is dependent on claim 27, Wood *et al.* is applied as in claim 15 above.

In regard to claim **33** which is dependent on claim 27, Wood *et al.* is applied as in claim 20 above.

In regard to claim **34** which is dependent on claim 27, Wood *et al.* in view of Duvall, III is applied as in claim 21 above.

In regard to claims **35** and **36** which are dependent on claim 27, Wood *et al.* is applied as in claims 22 and 23 above.

In regard to claims **37** and **38** which are dependent on claim 27, Wood *et al.* is applied as in claims 24 and 25 above.

In regard to claim **39** which is dependent on claim 27, Wood *et al.* is applied as in claim 26 above.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Thiede et al. (US 5,129,595).

In regard to claim **18** which is dependent on claim 17, Thiede *et al.* is applied as in claim 6 above.

In regard to claim **19** which is dependent on claim 18, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises digital memories to store the correction values for each microbolometer in the array.

Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619) as applied to claim 29 above, and further in view of Thiede et al. (US 5,129,595).

In regard to claim **30** which is dependent on claim 29, Thiede *et al.* is applied as in claim 6 above.

In regard to claim **31** which is dependent on claim 30, Wood *et al.* is applied as in claims 16 and 17 above.

In regard to claim **32** which is dependent on claim 31, Wood *et al.* is applied as in claim 19 above.

(11) Response to Argument

Appellant argues (pg. 13-16 of the appeal brief filed 6 December 2004) that Wood *et al.* and incorporated by reference Wood do not teach applying two or more bias pulses substantially sequentially to each microbolometer in the array during a frame time. Examiner respectfully disagrees. First it is important to recognize that frame time is the time in which a microbolometer produces a complete picture or image of an object being viewed (see lines 6 and 7 on pg. 2 of the specification as filed). Wood *et al.* state (column 5, lines 47-53) that "If desired, slower slide velocities, or multiple scans of any desired region of the scene, can be employed to allow sensitivity improvement by multiple measurement and averaging of sensor signals: in this case, a

stable platform for example, a tripod mounting of the camera may be required, analogous to long exposures of visible photographic still frame cameras". The key phrase is "multiple measurement and averaging of sensor signals". Thus, Wood *et al.* disclose obtaining sensor signal averages of multiple measurements so as to produce a complete picture or image within the exposure (*i.e.*, frame) time.

Further, incorporated by reference Wood states (column 2, lines 51-53) that "The passive elements of the focal plane array in the package 10 need to be polled or interrogated by providing a voltage or a current" and (column 6, lines 18-20) that "In FIG. 6 the voltage level indicated by line 5 is that of the pulse biased current supplied to a single microbolometer in a focal plane array over time". Thus, incorporated by reference Wood disclose that a single measurement is obtained by applying a single pulse biased current to a single microbolometer in a focal plane array. Therefore, the multiple measurements of Wood *et al.* necessarily imply applying a sequence of pulse biased current to a single microbolometer in a focal plane array. That is, "multiple measurement and averaging of sensor signals" necessarily implies applying two or more bias pulses substantially sequentially to each microbolometers in the array so as to obtain two or more measurements (corresponding to the two or more bias pulses) from each microbolometers in the array for averaging to obtain a complete image.

Therefore, Wood *et al.* (and incorporated by reference Wood) expressly or inherently teach all elements as arranged in the instant claims.

Appellant's arguments (pg. 16-30 of the appeal brief filed 6 December 2004) for claims 1-27 and 29-39 appear to refer the arguments on pg. 13-16 of the appeal brief

filed 6 December 2004. Examiner respectfully disagrees for the reasons discussed above.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

SL
February 9, 2005

Conferees
Shun Lee, Art Unit 2878 SL
David Porta, SPE, Art Unit 2878
Brian Sircus, SPE, Art Unit 2836

HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN, NJ 07962-2245